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飓风对外国直接投资的影响：加勒比视角

Impact of Storms and Hurricanes on Foreign Direct Investment: A Caribbean Perspective

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摘要

在加勒比地区的外国直接投资（外国直接投资）的重要性已成为其对经济发展和增长的巨大影响的结果。此外，自 20 世纪 80 年代以来，该地区的飓风和风暴的出现也有所增加，因此，实现对该地区的外国直接投资的依赖性和破坏性的影响，飓风可以有，本文旨在解释是否出现的飓风和风暴有一个显着的影响外国直接投资流入的结果，造成灾难性的风险。面板数据收集来自 12 个国家的地区。使用国家一级的数据，从 1980 到 2012，它被发现在该地区的飓风和风暴的数量减少外国直接投资流入，但是这种关系并没有发现有统计学意义。此外，没有任何证据表明风暴或飓风可能会对外国直接投资产生负面影响，在其发生后两年。本文还简要讨论了该地区的外国直接投资流入的来源。

关键词：外商直接投资；飓风；风暴；加勒比

Abstract

The importance of Foreign Direct Investment (FDI) in the Caribbean has grown as a result of its great impact on both economic development and growth. Additionally, the occurrences of hurricanes and storms within the region have also increased since the 1980s. Hence, realizing the dependence of FDI in the region and the destructive impact hurricanes can have, this paper seeks to explain whether the occurrences of hurricanes and storms have a significant impact on foreign direct investment inflows as a result of the imposing catastrophic risk. Panel data was collected from 12 countries in the region. Using country level data from 1980 to 2012, it was found that the number of hurricanes and storms in the region decreased FDI inflows, however this relationship was not found to be statistically significant. Additionally, there is no evidence that a storm or hurricane can negatively affect FDI up to two years after its occurrence. The sources of FDI inflows into the region are also briefly discussed in this paper.

Key Words: Foreign Direct Investment; Hurricanes; Storms; Caribbean; Empirical Research

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Chapter 1: Introduction

For centuries, natural disasters have had rampant destructive effects on social and economic development, the environment and last but certainly not least humans. It is a well-publicized phenomenon because each and every year, some country is affected whether it be through drought, flood, storm, tornado, tsunami, plague and so much more. Some popular examples are Hurricane Katrina that made landfall in the United States of America in 2004 and in Japan, the Tohoku earthquake and tsunami in 2011 which is considered one of the costliest natural disasters to date. These natural disasters even date back to 1755, where there was an earthquake that devastated Lisbon and killed an estimated 60,000 people out of a 275,000 population (Stromberg 2007). Henceforth, the impact of natural disasters has become a major consideration for countries and organizations worldwide.

There are numerous studies focused on the impact of natural disasters. Some areas that the extensive literature covers include the impact of natural disasters on growth (Klomp and Valckx 2014), development (Stromberg 2007), financial stability (Klomp 2014), and international financial flows (Yang 2008). However, most studies do not analyze the impact of hurricanes specifically. The studies focus predominantly on all natural disasters and in varying regions of the world. However, so far, no research has been conducted in the Caribbean about the impact hurricanes can have on FDI. Nonetheless, some related existing literature covers the impact of natural disasters on FDI in South-Eastern Asia (Kukulka 2014) but this was based in 5 countries and 5 types of disasters.

In the Caribbean, the natural disaster of major concern is that of hurricanes and storms. In the last decade, there has been a growing number of hurricane and storm occurrences and they consistently have an impact on the economic growth and development. Moreover, the countries in this region are very small and dependent on foreign direct investment (FDI). In 2011, some countries reported that FDI inflows were approximately 10 percent of Gross Domestic Product (GDP). Therefore, the catastrophic risk associated with hurricanes and storms may affect the total amount of FDI flowing into the region. Using a quantitative approach based on 12 countries and data from 1980 to 2012, an analysis of how this natural disaster affects foreign direct investment in the region will be conducted. This paper therefore aims to determine whether the presence of

a hurricane or storm has a significant impact on FDI and to briefly discuss some of the major contributors of this FDI.

Chapter 2: Background

The destruction caused by hurricanes in the Caribbean has shaped history and will continue to have implications for the future of the region. Few things in nature can measure up to the destructive force of hurricanes. In 2010, Hurricane Earl caused an estimated economic cost of $12.6 million (US) to one nation, Antigua and Barbuda. Moreover, in the same year, Hurricane Tomas was responsible for 44 deaths in the Greater and Lesser Antilles[1]. It destroyed approximately 1200 houses in Barbados, producing an estimated cost report of about $8.5 million (US). The effects of hurricanes in the region can be further emphasized in the following table from 1998 to 2013.

In 2004 alone (as shown in the table), there was an estimated $84 billion reported in damages in the region. In 2013, estimated damages amounted to $15 million US. This table includes all countries located in the Caribbean region, including Cuba and the overseas territories of the United States, United Kingdom, France and the Netherlands. Consequently, in 2006, there is no figure for total estimated damage because estimated damages for Cuba are not disclosed and it was this country that were affected that year. Nonetheless, it can be observed how cataclysmic these hurricanes and storms can be.

To add to this mass destruction, over the last decades there has been observed increases in the number of reported natural disasters. According to an article by Carey (2005) the total number of hurricanes has dropped worldwide except for in the Northern Atlantic Region[2] where the number of severe hurricanes has doubled. Hence, this demonstrates how seriously the impact of hurricanes should be taken in this region.

[1] Lesser and Greater Antilles refer to regions within the Caribbean.

[2] North Atlantic region refers to the Caribbean and North America.

Table 1: The Economic Effects of Storms and Hurricanes In the Caribbean from 1998 to 2013

Year	Total deaths	Affected Persons	Injured	Homeless	Total damage US$ ('000)
1998	550	1,844,000	649	122,000	6,696,500
1999	44	235,307	67	29,677	826,950
2000	18	675	0	1,200	6,000
2001	40	5,914,545	23	380	661,517
2002	58	426,105	4	2,000	81,230
2003	151	265,665	93	12,570	44,720
2004	6205	987,741	2,810	61,060	8,431,719
2005	128	2,658,344	58	185	2,185,000
2006	22	46,930	18	-	-
2007	351	623,451	370	17,297	1,622,700
2008	735	816,905	107	30	4,138,198
2009	53	20,631	0	9,910	52,403
2010	229728	4,062,407	577,546	100	8,188,100
2011	53	74,049	232	1,407	570,000
2012	368	544,662	27	119,971	270,542
2013	26	38,096	37	33,765	153,102
Total	**238,530**	**18,559,513**	**582,041**	**411,552**	**33,928,681**

Source: Collected from the EM-DAT (Emergency Database) maintained by the Centre for Research on the Epidemiology of Disasters (CRED).

Note: Affected persons refers to those persons that need immediate assistance that may require survival necessities such as water, shelter, food, sanitation, medical assistance

There has also been a notable spike in the amount of foreign direct investment (FDI) inflows especially those inflows to developing countries. The Caribbean region receives some of the highest levels of FDI on an international basis. In 2013 alone, the region received $6.059 billion in inflows and this was a 19% decrease from the year before (The World Bank 2014). Moreover, the economies receive very high levels of FDI flows relative to country size. This means that transnational corporations make up a large percentage of economic activity in the region (ECLAC 2009). Hence, FDI is implicitly important to the growth and development of these countries.

Furthermore, due to the fact that investment is determined by expected risk and return, the effect of the catastrophic risk on FDI should be investigated. This is necessary because the occurrence of a hurricane or storm in the Caribbean region is pretty much unavoidable, highly probable and increasingly destructive. Hence, this study seeks to determine the magnitude of an impact of hurricanes on resource flows in the Caribbean. By how much does foreign direct investment change as a result of the occurrence of a hurricane in the region? Who are the main contributors to this foreign direct investment in the region? This research is very much of educational value because hurricanes will always exist and their impact will always be an area of concern. Additionally, since FDI is an imperative factor of growth, the governments of the Caribbean territories as well as other small developing economies would have a general idea of changes in FDI due to a natural disaster and concurrently implement policies that could reduce the effect.

Chapter 3: Literature Review

Since the 1960s, the number of disasters has increased by around 5% per year and the number of people affected by 4% (Stromberg 2007). Hence, every year economies all over the world are exposed to increasing catastrophic risk. Along with greater damages, this increasing risk causes a depletion of scarce natural resources and fatalities fostering a decline in both economic growth and development. For these reasons, there has been increasing considerations as it relates to this phenomenon; however, there are still some limited and underdeveloped areas in the literature.

Currently, there are numerous newspaper articles as well as studies focused on the economics of hurricanes and typhoons especially in the Atlantic and Pacific region. There are four competing theories about the impact of destructive hurricanes and storms. These theories are that the impact of these disasters may permanently set a country back – "no–recovery" hypothesis; secondly, investment would increase to replace destroyed assets which might lead to even greater long run growth – "creative destruction" hypothesis; it might lead to a rebound to normal growth or even abnormal growth levels - "recovery to trend" hypothesis; or lastly it may rid the country of outdated infrastructure allowing for structural updates– "build back better" hypothesis (Hsiang and Jina 2014). Hence, it can be seen that there are different approaches and sides in the literature when it comes to the impact of natural disasters.

For instance, Anttila-Hughes and Hsiang (2013) posited that natural disasters have a negative permanent effect on countries through infant mortality, destruction of durable assets, reduction of income and thus consumption and investment, supporting the "no recovery" hypothesis. This paper was a very thorough approach to analyze the impact of typhoons using a wind-field model to measure the impact of the intensity of a hurricane. However, this research is based on one country bringing into question the external validity of the paper. Subsequently, there is much existing research that supports the creative destruction hypothesis. Albala-Bertrand (1993) found that there was an immediate positive impact of natural disasters between the years 1960 and 1970. However, it was questioned by Skidmore and Toya (2002) who argued that there's a positive effect on GDP because the destruction in GDP is not recorded and the increase in GDP is as a result of reconstruction. Yet, the creative destruction hypothesis is still supported by Skidmore and Toya (2002) who showed a positive correlation between the occurrence of a natural disaster and

economic growth in the long- run through accumulation of human capital and increases in productivity. Hence, there is evidence of an ongoing debate about the impact of natural disasters.

Moreover, there is significant evidence that indicates that the destruction caused by natural disasters enable higher long-run growth of GDP per capita in developing countries by providing the opportunity to upgrade capital – "build-back better" hypothesis (Cuaresma et al. 2004). Whilst, Klomp and Valckx (2014) conducted a meta- regression analysis and found that there is a significant immediate adverse impact on economic growth, which increases in developing countries over the period of analysis, but in the long run GDP per capita returns to its original growth path - "recovery to trend" hypothesis. So there is much inconsistency in the literature as researchers support different hypotheses.

As it relates to investment, Escaleras and Register (2011) researched the relationship between natural disasters and foreign direct investment in 94 different countries and found that there is a significant negative correlation. This is because investment is determined by expected risk and return, therefore the catastrophic risk that comes with the occurrence of a natural disaster would have some impact on FDI decisions. The paper took into consideration the number of hurricanes occurring in the previous year, previous 5 years, previous 10 years and lastly previous 25 years and in each instance a strong negative correlation was found. However, results of the research reflect both developed and developing countries where it would be better if they were separated.

The literature on the impact of natural disasters is very expansive. There are studies which analyze the impact on financial fragility (Klomp 2014), international financial flows (Yang 2008), foreign direct investment (Escaleras and Register 2011), economic development and humanitarian aid (Stromberg 2007) and much more. My study focuses on the immediate impact of hurricanes on FDI in the Caribbean. However, a large majority of the existing body of literature including this paper focuses on the short run impact creating a shortage of literature on the long-run. This problem exists because there is difficulty in predicting how variables would behave given there was no occurrence of a natural disaster. Nevertheless, most studies, of late, have realized this shortage and zoned in on the long-run impact.

3.1 Natural Disasters and the Caribbean

When the natural disasters are addressed, the impact storms and hurricanes will have on the Caribbean is always a major concern. In 2004, during the hurricane season, damages amounted to approximately $3.1 billion[3] which cut into significant proportions of GDP in the economies, ranging from 10 percent in Jamaica to more than 200 percent in Grenada (Heger et al. 2008). Hence, the region is susceptible to natural disasters. This vulnerability is further heightened as most of the economies are very dependent on agricultural goods and tourism such that the destruction caused by hurricanes in the Caribbean has affected history and will always have an implication for the future of the region.

According to the data collected from the Hurricane Research Division of the Atlantic Hurricane database, there has been an average of 6 hurricanes a year based on the time period 1982 to 2013 in the North Atlantic basin. Further studies found that the global number of intense Category 4 and 5 hurricanes nearly doubled in number, jumping from 50 per five years during the 1970's to 90 per five years in between 1995 and 2005 (Carey 2005). Moreover, this study found that this increase was more prevalent in the North Atlantic Basin. This is a somber implication for countries located in this region as it is already recognized as one of the most indebted regions in the world relative to country size, to further complicate matters with hurricanes which have been found to retard both economic growth and development.

The body of literature focusing on the Caribbean is rather limited but there are a few studies. Strobl (2010) conducted a study on the macroeconomic effects of a natural disaster in the Caribbean and Central America using a wind-field model. It was estimated that the loss in output growth for an average hurricane is about 0.84 percentage points taking into consideration rainfall and seasonal effects. These findings agree with those of Klomp and Valckx (2014), where there is an immediate negative impact, however, both studies did not mention the long-run impact.

Along with size and location, another factor that makes the region so vulnerable to natural disasters is the dependence on scarce natural resources. Hurricanes often cause a depletion of natural resources, the impact of which is severely amplified in small developing states where the production of agricultural products drives economic growth. Mohan and Strobl (2012) stated that

[3] Estimated damages amount differs from that estimated by EMDAT because the study focuses on a select sample whereas EMDAT accounts for all countries.